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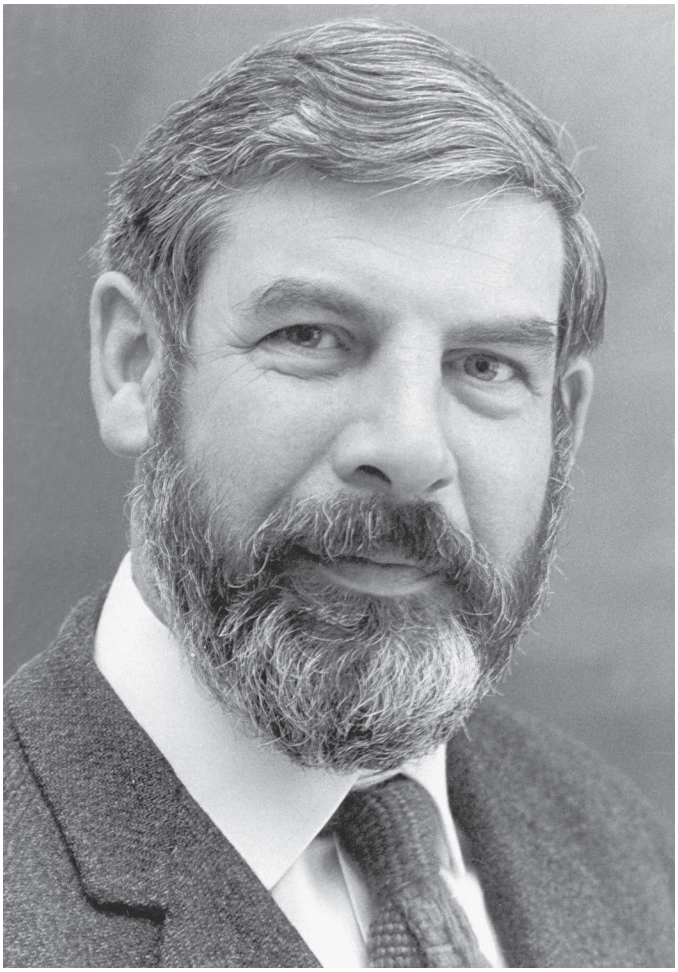
COLIN BRUCE BRADLEY BULL (1928–2010)

Colin Bruce Bradley Bull was born on 13 June 1928 in Birmingham, United Kingdom. The family moved to Herefordshire, where Colin completed his early schooling. In 1945, he enrolled at the University of Birmingham and earned a Bachelor of Science in physics with first-class honours. A following master's degree quickly led to a doctorate in solid-state physics in 1952. While writing his thesis, which related to the properties of fluorescent coatings on radar screens, Bull was introduced to rock climbing in Great Britain. And in the summer of 1951, as if to apply what he had learned, he traveled with a group of hardy, geologically minded graduate student friends to Spitsbergen, where they figured out the geological structure and history of a selected area of the island. He wrote a highly readable book about this venture called *Innocents in the Arctic* (Bull, 2005). The experience must have made a lasting impression upon him because after only a short time in the Physics Department of Cambridge University, he joined the British North Greenland Expedition (1952–54) as a geophysicist-glaciologist and meteorologist. He used a Worden gravity meter to determine the thickness of the Greenland ice cap and also did gravity traverses over proglacial lake ice to determine lake depth. The Greenland expedition marked his departure from experimental physics into a life of exploration and glaciology, with a gravity meter as his "stock research instrument." In 1955, he joined the Cambridge (UK) expedition to the Norwegian glacier Austerdalsbrae, where again he employed a gravity meter to determine glacier thicknesses. This was the first time that the method had been applied to a valley glacier (Bull and Hardy, 1956).

In 1956, he married Diana Gillian Garrett. Soon after, they emigrated to New Zealand, where Colin accepted a senior lectureship in the Department of Physics at Victoria University of Wellington (VUW). His polar experience was immediately put to use when he assumed the leadership of the 1958–59 VUW Antarctic Expedition to the Dry Valleys region. He returned to Antarctica as a member of the 1960–61 VUW Antarctic Expedition party. On both expeditions, he used a gravity meter in the Wright Valley and the Koettlitz Glacier region both to delineate geological structure (a rock fault) and to determine glacier thicknesses. At a 40th anniversary celebration, Colin was commissioned to write a book about the 1958–59 VUW Antarctic Expedition, which was published in 2009 as *Innocents in the Dry Valleys*, using the now familiar Twainian title twist. In 1961, Colin accepted an invitation by Richard P. Goldthwait, Professor of Geology at the Ohio State University (OSU), to relocate to Columbus, Ohio. There he taught geophysics (specializing in glaciology) and helped to establish the Institute of Polar Studies, later called the Byrd Polar Research Center (BPRC). The next summer he and four others journeyed to Southwest Greenland to begin a reconnaissance of the Sukkertoppen ice cap. On the expedition was Fritz Löwe, the legendary German meteorologist who was a member of the 1930–31 Alfred Wegener expedition to the Greenland ice cap. Together with Henry Brecher, now a BPRC icon, Colin and Löwe established a line across the ice cap, along which gravity measurements were made to determine ice thicknesses. By now, Colin was known for his expedition cooking.



Colin Bull ca. 1971.

In February 1964, I attended Ohio State University to study glaciology under Professor Bull and glacial geology under Professor Goldthwait. That summer, after spring course work, Colin persuaded me to join him and two of his other grad students and Henry (from the Geodetic Sciences Department, OSU) at the Arctic Institute of North America's research station at Kluane Lake, Yukon. We were all flown up to "Divide Camp" on the Kaskawulsh Glacier. Henry and I opted to do our master's theses on the north arm of the glacier, I measuring crevasse geometries and dynamics and Henry measuring short-term variations in ice flow rate. Without my being aware of any "arrangement," Colin turned up one day with the OSU Worden gravity meter! He did the gravity measurements I needed along one of our surveyed lines, as well as the reduction of the data.

In spring 1965, we received the first of three annual grants from the National Science Foundation for studying

processes within a glacier that was frozen to its bed. Colin had determined, on the basis of observations he made during the VUW Antarctic Expeditions, that one of the Wright Valley (Antarctica) glaciers would be suitable. By late November 1965, I was starting my PhD fieldwork on the Meserve Glacier, which I had selected. He had judged that with my engineering and mountaineering background, I could figure things out. He once told me that he held engineers in high regard, when, while traversing the ice cap during the British expedition of 1952–54, they encountered a dubious snow bridge spanning a very large crevasse, and the leader had halted the convoy of weasels. In order to avoid a lengthy detour, the engineers were asked to assess the situation. They measured the dimensions of the bridge and the snow temperature, consulted some snow strength graphs, 'worked' their slide rules, and finally announced that the convoy could proceed over the bridge! It held firmly. Another story about the same expedition shows Colin's humorous side. The person who had calculated the amount of dried vegetables for two years had made a large error (on the very generous side), and at Colin's suggestion, the least popular, cabbage flakes, were selected to mark the summer layer along the traverse for future exhumation in a series of snow pits to be dug the next year; this cabbage layer would nicely provide an accurate value for the snow accumulation rate. Once, when he visited my glacier bed research operation at Meserve Glacier, which involved 100 m of main tunnel and drifts, we were discussing what to do with all the accumulating empty 55-gallon fuel drums lying around. After Colin gleefully recalled an event during the British North Greenland expedition that involved empty fuel drums, novel technology, pyrotechnics, and competitions, I got an idea.

Lacking a suitable venue at Meserve Glacier, I then proposed that we mix stove oil in a drum with the residue of aviation fuel and its attendant vapour, then lower an electrical blasting cap into it. (I had been blasting off the ice cliff flakes with explosives to remove the danger of someone being hit by falling ice while entering or exiting the tunnel portal at the base of a 15 m high cliff.) We took cover, and I hit the switch. A deafening roar occurred, followed by a buzzing sound as a steel disc passed rapidly over our heads. After the grey mushroom cloud dissipated, an inspection of the drum showed a clean-as-a-whistle open end, and we realized that this was a superior method of creating garbage cans or survey beacon hardware, which had previously required tedious hammer-and-chisel cutting to produce. Colin and I had just experienced a Eureka moment; I think it might have helped my PhD along.

I was about third in his succession of 14 graduate students from six countries in the 1960s and 1970s. Two of his distinguished glaciology students remained at OSU: the late Professor Ian Whillans and Professor Lonnie ('Iceman') Thompson. Thompson and his wife, Professor Ellen Mosely-Thompson, expertly maintain a busy ice-core processing laboratory and teach courses in glaciology/climatology. The contributions of Colin's students are just one of his many legacies. Colin was a member of the Board of Governors of the Arctic Institute of North America (1967–72), director of the Institute of Polar Studies (1965–69), Chairman of the Department of Geology (1969–72), and Dean of the College of Mathematical and Physical Sciences (1972–86). In that capacity, he strived to keep the growing Byrd Polar Research Center well supported. In 1986, he and Gillian moved to Bainbridge Island near Seattle. Colin maintained a large polar library and later began writing his own expedition books. He still found time to provide his glaciological expertise to a Chilean mining company.

Here is a man who was specially built for polar exploration, who received the Polar Medal from Queen Elizabeth II and the Antarctica Service Medal from the U.S. government for participating in more than 25 action-packed polar expeditions during his distinguished career. He was largely self-trained in "on the job" expeditionary matters, and, as typical of the adventurous British, he was a skillful improviser. His death came unexpectedly while he and Gillian were cruising the Alaska Marine Highway. For me this is not an obituary, but a tribute: his image and memory live on. He is survived by Gillian, Nicholas, Rebecca, Andrew, and four grandchildren.

ACKNOWLEDGEMENTS

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